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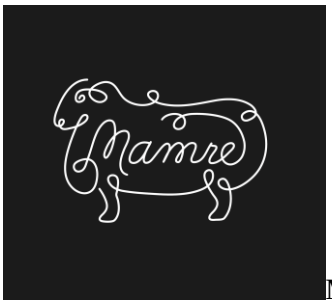
Intensive Sheep Farming

"the Mamre System"

A Practical Handbook



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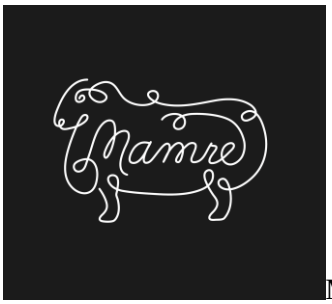

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1. Background

Extensive sheep farming is under pressure from several factors. An increasing intensification of the industry, as a result of this change there is a growing need for knowledge in intensive sheep farming. The purpose of this handbook is not to put comprehensive plan in place; however, it is to serve as a practical basis where further discussion, planning, research and development can take place. Our goal is to reflect practical knowledge as far as and we by no means regard ourselves as experts in the field. Since we come from a project basis back ground, we use it to guide the discussion.

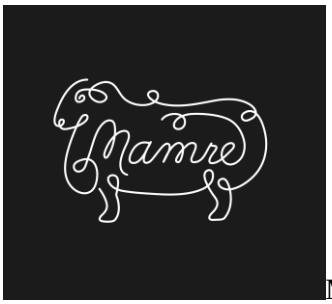
2. Project Management and Sheep Farming

Project management is a tool for a manager that can able him or her to organize daily tasks. If the project planning is well done, the rest of the management tasks will be much easier and the process more streamlined. Project management includes:

- Operations management (what should be done).
- Employee Management (by whom should it be done).
- How long will it take (time management).
- What is needed in terms of equipment and materials (inventory management).
- Budget Management – how much will it cost?
- Risks that can be seen (risk management).
- The quality that is required.
- Communications to all stakeholders during the project.

In theory a project is defined as follows:

- Projects have a clear beginning and end. In our case the project starts at the preparation of the ewes and rams, and ends at the weaning of lambs 8 months later.
- A project must have a life cycle, for example: Start, and then have a number of activities and then End.
- Budget where the cash flow is set out.
- Application of resources and coordination of the needs there of.
- A responsible person, for example: A project leader.
- A team with different roles.



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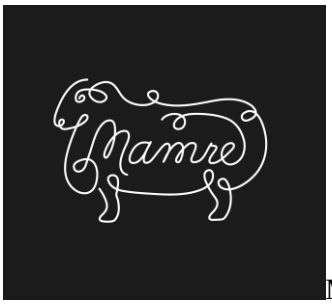

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The different phases of Project Management

A. 1. Define the project:
    - Scope of the project.
    - Success criteria.
    - Assumptions.
    - Risks and Restrictions.

A. 2. End consumer requirements:
    - What must be achieved?
    - Product specifications.

A. 3. Role player's involvement.

B. 1. Project planning:
    - Task definition structure.

B. 2. The project line is identified:
    - Each phase is broken down into elements.

B. 3. Costs are calculated – Financial Plan.

B. 4. Time management for each activity planned.

B. 5. Risk Analysis.

B. 6. Feedback on the planning process.

C. 1. Scheduling.

C. 2. Task scheduling:
    - What should be done?
    - What role is dependent on a previous action?

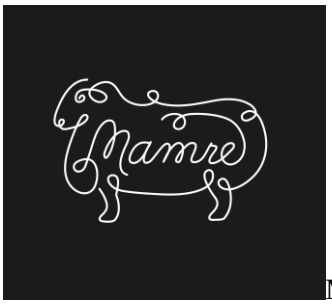
C. 3. Resource planning:
    - Availability and use.

D. 1. Implementation:
    - Start the project.
    - Monitoring and reporting.
    - Correction.

E. 1. End of the project:
    - Measuring success.
    - Closing recommendations (lessons learnt).

Mamre Project Plan

No.	Activity	Day	Date	Nutrition	Vaccinations & Dosing



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1	Preparing rams (this is every 6 months and done annually).	30	2012-12-18	Feed 2kg production ration/ram/ day	Dose for roundworms & nasal worms. Do necessary vaccinations. Give minerals and vitamins.

2	Preparation of ewes	30	2012-12-18	Ration of 500g/ewe/ day	Deworm ewes. Vaccinate against pulpy kidney and clostridia, Pasteurella and corynebacterium, enzootic abortion. Give minerals and vitamins.
3	Sponge ewes	0	2013-01-17		
4	Remove sponge	14	2013-01-31		Inject ewes with DMS, Mature ewes 3ml, Young ewes 2.5ml
5	Rams in	16	2013-02-02		
6	Rams out after 24 hours (1 Mature Ram to 5 or 8 ewes)(1 Virgin Ram to 3 ewes for 36 hours)	17	2013-02-03	Ration of 300g/ewe/day for 15 days then maintain 500g/ewe/day	
7	Scan ewes	73	2013-03-31	Ewes must be at a condition score of 3.5 & higher. They must not lose weight. Placental & udder development during this period is very NB!	
8	Start preparing ewes for lambing	119	2013-05-16	Start preparing ewes on lambing pen ration so that ewes are adjusted to the ration when they lam:	Deworm ewes. Vaccinate ewes against pulpy kidney, Pasteurella, & corynebacterium for maximum antibodies in the milk. Give minerals and vitamins A & E

				6 weeks before lambing – 500g/ewe/d 5 weeks before lambing – 750g/ewe/d 4 weeks before lambing – 1kg/ewe/d 3 weeks before lambing and after lambing – 1.25kg/ewe/day	
9	Prepare lambing pens	154	2013-06-20		Lime on the sawdust, Spray the pens with F10/HTH solution, all pens & water buckets & feed buckets must be washed with F10/HTH solution. Spray the barn for flies, flees & lice.
10	Start lambing	161	2013-06-27	Ewes get the same ration as before lambing, lams get creep feed adlib from 1 week old (a lam eats 25kg creep feed until it is weaned) (its optional for the lams to eat the ration with the ewes)	
11	All ewes out lambing pens	171	2013-07-07		
12	Dose lams (4 weeks old)	199	2013-08-04	Ewes still get ration as at lambing, , lams get creep feed	Dose lambs for tapeworms, give lambs minerals and vitamins

				adlib from 1 week old (a lam eats 25kg creep feed until it is weaned) (optional)	
13A	Drying up of ewes	222	2013-08-27	7 days before weaning ewes must be taken off the ration and any other high nutrient feeds/grass in order to avoid udder problems	
13B	Dose lambs (8weeks old)	227	2013-09-01		Dose lambs for roundworms and tapeworms, Vaccinate lambs with their1st clostridia and Pasteurella and 1st chorynebacterium. Give lambs minerals and vitamins.
14A	Wean Lambs	227	2013-09-01	Lams must now get the feedlot ration with Lucerne/teff as roughage	
14B	Ewes now follow next cycle	227	2013-09-01		
15	Dose lambs (12 weeks old)	255	2013-09-29	Lambs still on feedlot ration with Lucerne/teff	Dose lambs for roundworm and tapeworms, Vaccinate lambs with their 2nd clostridia and Pasteurella and 2nd chorynebacterium. Give lambs vitamins and minerals.

3. Micro vs Macro Intensive system

The intensive system can be treated as either micro or a macro system, this is up to the farmers own personal preference.

3.1 Macro Intensive system

In the macro intensive system farmers farm with large flocks of ewes which are also synchronised for lambing, and which could be accommodated in lambing pens. There are farmers using this system successfully. There are several factors that are important:

- The lambing pen facility should be large enough to accommodate the group of ewes that lamb every month at the same time.
- The changes from extensive system to an intensive system must be handled with caution.
- Cash flow and the adaptation of animals is probably the most important elements in order to make this system successful.

3.2 Micro Intensive system

Ewe flocks smaller than 250. This can be handled on a relatively small area, like plots.

4. Precision farming

We define precision farming as the precise measurement of the total process. Feed provided to the ewes and rams at the specific their specific stages according to their needs. All the 8 groups of ewes and the young ewes and the rams are dealt with simultaneously on different project plans every day.

Precision in respect of:

- Nutrition/feeding
- Health
- Labour
- Budget

5. Facilities

5.1 Start small

Our experience shows that when people start the system on a small scale and grow with it, they have the most success. If you experienced the system with 10 ewes you can easily manage 1000 ewes. Mistakes on a small scale also cost less.

5.2 Old and existing facilities

We must be view large capital expenditure with caution. Existing infrastructure can be converted to meet the requirements and cost less. Investment in genetics will unlock greater value in your business.

6. Design for second income

The micro intensive lambing system lends itself ideally to be used as a second income. Even on farms where extensive sheep farming is practiced, this system can be implemented for an ongoing slaughter lamb production unit or to produce rams for the large commercial flock. In the past diaries, were used to achieve a healthy and consistent cash flow. This is not always economically possible in certain areas and we believe that intensive sheep farming can fill this gap.

6.1 Long term investment phase

Since sheep farming has a long investment phase, attention must be given for the provision of cash flow. The budget must include the following elements:

- Facilities
- Purchase of animals
- Feed
- Labour
- Health

The budget must be planned in advance for at least a year so that the system can start generating a cash flow. There was a very good article by Koetoe Botha in the Landbouweekblad on the 17th April 2015, which specifically discusses the cash flow planning for intensive sheep farming.

6.2 Start small

Our experience shows that when people start the system on a small scale and grow with it, they have the most success.

For existing extensive sheep farmers switching to a more intensive system can sometimes be very difficult. The easiest way to achieve this is to focus only on the ewes with twins/multiples and start managing an accelerated lambing cycle with these ewes.

A large ewe flock is divided into 8 groups or 4 groups to fit into the system. For example:

- 1000 ewes / 8 groups = 125 ewes per group to lamb every month, or else
- 1000 ewes / 4 groups = 250 ewes per group to lamb every two months.

This system is a dynamic process, therefore it should be remembered that the system must be adapted to suit your needs.

7. Mamre Dormers Project Plan

When we started with the Dormers our goal was to farm with them intensively with the use of lambing pens. It sounded easy, but little did we know what the system really entails. The most important aspect is the accelerated lambing cycle that we have decisions going on over every eight months. The ewes were then divided into groups, initially 5 groups. When the first 2 groups lambed and then the 3rd group had to be prepared for lambing as well as having to wean the lambs of group 1, we realized here comes "CHAOS" and why most farmers told us that this system is not sustainable and why it can't work.

I spoke to Manie and explained to him my dilemma. Fortunately, with his background in project management he was able to come up with a project plan for intensive sheep farming and immediately from "CHAOS" we changed into a workable and calm farming system.

Here follows a detailed discussion about the MAMRE project plan for intensive sheep farming.

7.1 Preparation of rams

Management:

Rams must be tested for fertility at least once a year and preferably done more frequently. The testes should be examined for every test done, in order to check for abnormalities. Rams play a vital role in the intensive system as one ram is responsible for the ewes it is paired with. If there is any problems with the rams it is going to have major consequences on the whole system. It is also preferable to have two groups of rams with one group covering ewes every second month. This is preferable as the formation of sperm takes 6 weeks and an over worked ram does not bode well in the

long run. The rams must also be fit in order to achieve the best results. If rams aren't getting along with each other it is best to separate them and avoid any injuries.

Before rams are used to cover ewes it is important to examine their hooves to ensure that they can mate sufficiently. If their hooves are to long they must be trimmed in order to ensure they can cover the ewes sufficiently.

Then all that is required is just a general observation of the rams to ensure they are ready for mating.

If elected and if circumstances allow it, rams can be sheared to ensure they always have short wool when they go to the ewes.

Nutrition:

The rams should be in top covering condition (point 3-4/5). The rams should not be too fat as this will affect their covering power and if they to heavy they can injure the ewes, especially maiden ewes. The lick we recommend is a good maintenance / production lick to be provided throughout the year, for these rams in winter and summer to stay in top condition on the veld.

Health:

The rams are covering ewes in the kraal at least every two months. When they come out from the ewes it is advised to FAMACHA and making sure there are no parasites present. The rams are only dosed according to the FAMACHA system.

The rams are dosed for Roundworms, Tapeworms, Liver Fluke, Sheep Scab Mites, Nasal worms, Blowfly and Itch Mite.

They are also given all the necessary vitamins and minerals. Then they are further vaccinated against the following; Pulpy Kidney, Tetanus, Pasteurella, Corynebacterium and yearly against blue tongue.

All rams under 3 months are vaccinated with Brucella Rev 1.

7.2 Preparation of ewes

Management:

For the management of this system every sheep on the farm must have a clear and permanent number. As ewes sometimes run in one large flock and the permanent numbering system is important in order to sort out individual ewes.

When the lambs are weaned from the ewes, the ewes are then dried up and they have to get into the necessary condition in order to be synchronized again within four weeks. It is now important to go over the ewes and check their udders, teeth and hooves. This is done to ensure that they are in ideal condition and status for the next mating. If decided upon and if the weather allows it ewes can also be sheared now.

Nutrition:

The ewes must be kept in good condition from weaning until synchronization. Their condition score must be maintained at 4 to 5.

The young ewes which at 11 months are synchronized for the first time must be on a medium to high nutrient level feed/lick, to ensure a condition score of 4/5 at synchronization.

Health:

When lambs are weaned the ewes are dosed against Roundworms, Tapeworms, Liver Fluke, Sheep Scab Mites, Nasal Worms, Blowfly and Itch Mites.

They are also given all the necessary vitamins and minerals. Then they are further vaccinated against Pulpy Kidney, Tetanus, Pasteurella, Corynebacterium, and Yearly Bluetongue.

The maiden ewes that are synchronized for the first time at 11 months of age are dosed and vaccinated according to the older ewes. However maiden ewes at the age of three months are vaccinated for Enzo-otic Abortion, and Bluetongue A, B en C separately as required.

8. Sponge process for the synchronization of sheep

8.1 General information: Hand covering

With hand covering, specific ewes are put with specific rams and they are then supervised. Ewes can be helped to be prepared for mating on specific days with the use of synchronization drugs. This facilitates and simplifies management. In a stud this is the most important aspect, which makes management and procession record keeping easy.

Advantages:

- Less rams are required. Therefore a breeder can purchase better quality rams, which accelerate genetic progress.
- The purchase, feeding and care for fewer rams, reduces the total cost per lamb.

- Less ram management.
- Rams with weak libido and impregnation ability are identified and culled.
- Injuries of rams are minimal as hand covering under supervision takes place, and rams can't injure themselves.
- Progeny of individual rams can be compared and the best sires identified.
- Facilitates with accurate record keeping.

Disadvantages:

- If a ram is temporarily infertile or his semen quality is of a low quality ewes will not conceive. It is therefore very important to ensure the rams semen is quality tested beforehand. Ensure that rams are ready for covering.
- If untried and untested rams are used, poor quality lambs can be achieved.
- Responsible person must supervise and be ready.
- Guard against inbreeding.

8.2 Project plan

Start preparation of rams (1 month before sponge date).

Feed rams so that they are in good condition (4/5).

Dose rams for roundworms and nasal worms and the necessary vaccinations and inject them with minerals and vitamins.

If required shear the rams.

Start preparation of ewes (1 month before sponge date).

Deworm ewes.

Vaccinate for Pulpy Kidney, Clostridia, Pasteurella, Corynebacterium, and Enzootic Abortion and inject them with minerals and vitamins.

If required shear ewes (your own specific programme).

8.3 Sponge the ewes

This process is at the heart of the project plan. If your preparation is right, you sponge carefully and you work as clean as possible this will ensure that your ewes come on heat and the rams do their job and then the system will be profitable.

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All sponge and synchronization equipment is available at RAMSEM in Bloemfontein and they also offer AI courses which are good to attend.

Requirements:

- Bucket with water and disinfectant in.
- Clean towel.
- Cotton
- Sponges/CIDR's (personal preference).
- Applicators to insert sponges or CIDR's.
- Antiseptic cream.
- Scissors.
- Gloves.
- Mark paint.

Process:

Insert the sponge in the morning at around 08:00.

This is the bucket with the water and F10 disinfectant, this is used to wash the device (applicator) between the different ewes and to wet the cotton in order to clean the ewe before the sponge is inserted.

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This is my clean towel to keep the area where my equipment is as clean as possible. With my role of cotton I tear off a reasonable portion from it and soak it in the water and disinfectant solution to clean under the ewe's tail. Antiseptic cream is then applied to each sponge before it is inserted into the ewe.

Naturally your note book with numbers and dates is on hand to make notes on the condition score and general appearance of the ewe, and also how easy it was to insert the sponge.

The Ovakron 40mg vaginal sponges (see above picture).

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After the ewe has be cleaned with cotton wool around the anus and labia area, left her tail, hold the applicator with the sponge ready loaded (the sponge is inserted into the applicator with the strings first, so that when the sponge is in the ewe, the strings stick out of the ewe) in your dominant hand. With the non-dominate hand, open the labia's with your thumb and middle finger in order to insert the applicator in easily. The whole sponge is in the pink cream.

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Once the device is placed in the ewe's vagina first squeeze upwards and then over the ligament backwards. Note Manie's hand, and the angle of the device.

The device is now as deep as possible and is now squeezed into the ewe.

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The “plunger” (white bar) is pressed forward to release the sponge from the applicator, so that it remains in the ewe. Remember not to pull the strings.

The device and the “plunger”, is pulled out together and the sponge left behind.

Here you can only see the strings, they are now tied together so they are 3cm in length and the rest of the strings are trimmed away with a pair of sharp scissors. The strings must not hang out to far as the ewes pull each other's sponges out and they also can hook on objects and be pulled out.

These strings are tied and she is marked and ready to leave the crush.

These ewes have been sponged and been marked on the nose. They now go back to their camp, where they stay for 2 weeks and then we continue the process.

8.4 Removal of sponges

14 days after the sponges were inserted, the ewes must come back to the kraal in order to remove the sponges.

Winter programme: Sponges removed at 18:00 and PMS is immediately injected intramuscularly. Rams are then put in with the ewes on day 16 at 06:00 – 07:00.

Summer programme: Sponges are removed at 06:00 and PMS is immediately injected intramuscularly. Rams are then put in with the ewes on day 15 at 16:00.

The amount of PMS that is injected is based on the prescription from RAMSEM and depends on the size of the ewe (depends on breed). With Dormer ewes use 3ml DMS for mature ewes and 2.5ml for 11 month old maiden ewes.

Requirements:

- Plastic bag to throw away used sponges.

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- Gloves.
- Book with ewe numbers for notes, if sponges are lost.
- PMS in cooler bag with precision syringe and long pink needle.

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Removal process:

Position the ewe in the crush, search for the stings of the sponge (sometimes they are in the vagina, open the labia's and search for the strings making sure that the sponge hasn't fallen out). If the strings can't be found, use the applicator to search for the sponge before assuming the sponge has fallen out. Make dead sure that the sponge is not in the ewe still, if you leave it in it can lead to infection and the ewe could die. Place a pole on the railings of the crush, lift the ewe's hind legs over the pole so that she hangs in the AI position. Place the applicator in the vagina and use a touch in order to provide light, if the sponge is there you will see it clearly. This can be done with a speculum and then you pull the sponge out with tweezers, this equipment is available at RAMSEM. If you are sure the sponge has fallen out, mark the ewe and then send her to be synchronized with the next group.

Pull downwards on the strings until the sponge is removed. Throw away the sponge so that other animals can’t eat it.

Inject the ewe with the correct amount of PMS intramuscularly.

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Pull back on the syringe to make sure there is no blood and you not in a vein. Don’t inject into a vein.

A group of ewes that have had their sponges removed and been injected with PMS. They will be ready for the ram in the next 36 hours.

8.5 Ramsem

For all synchronization information and equipment as well as AI courses contact RAMSEM.

www.ramsem.com

051 412 6327

Bloemfontein

9. Covering or mating methods

9.1 Laparoscopic insemination

Intra – urethral AI or Laparoscopic AI involves the insemination of semen directly into the uterus horns. This is done by strapping the ewe to a harness upside down. A small surgical incision is made in the abdomen. An endoscope is used to detect the reproductive organs and to place the semen into the uterus horns. The conception rates with this method vary between 50 – 80%. The pre-treatment of the ewes plays a very important role in the success of this method. It is very stressful for the ewe and this can effect fertilization. With this method of insemination, fresh and frozen semen can be used.

9.2 Artificial insemination

AI is done in sheep, but it is not as nearly as common and successful as with cattle. A ewe has a complex cervix that makes trans-cervical AI very difficult. There are four methods to AI sheep:

- Vaginal
- Cervical
- Trans-cervical
- Intra-urethral as described in 9.1

Vaginal AI is the simplest method of AI in sheep and involves the insemination of semen into the vagina without going through the cervix. The success of this method is very erratic and the results are poor.

Cervical AI is relatively cheap and a simple way of insemination. The cervix is located through a speculum with a light source. The first fold of the cervix is then inseminated. The success of the method is better when fresh semen is used.

Trans-cervical insemination involves the cervix being held with instruments and insemination is done with an instrument that penetrates the cervix. Like cervical AI this method is also more successful with the use of fresh semen.

9.3 Hand mating

In our view, the success of the intensive system is directly connected to the synchronization and hand mating method. After ewes have been synchronized they are then placed with rams. The ratio we use is 1 ram to 5 ewes. The rams are only left with the ewes for 24 hours, this then ensures that you lamb over 3 to 5 days. We don't use follow up rams in our system, as this complicates our management with the lambing pens. We use small camps/holding pens where the ewes remain with the ram for the entire period of 24 hours. They get clean water, fresh feed and a ration. This method also helps facilitate with precision management as we know exactly which ram went to each ewe. This helps with the information provided to Studbook.

9.4 Programme for hand mating

Winter programme

Day	Date	Time	Task
0	Mon – 04/05/2015	Morning	Sponge ewes
14	Mon – 18/05/2015	18:00	Remove sponges & inject DMS
16	Wed – 20/05/2015	06:00 – 07:00	Put rams in
30	Wed – 19/06/2015		Put in follow up rams
150	16/11/2015		Lambing time

Summer programme

Day	Date	Time	Task
0	Mon – 04/05/2015	Morning	Sponge ewes
14	Mon – 18/05/2015	06:00	Remove sponges & inject DMS
15	Tue – 19/05/2015	16:00	Put rams in
29	Tue – 18/06/2015		Put in follow up rams
150	15/11/2015		Lambing time

Makeup of PMS:

Dissolve 1 x PMS in 50ml sterile water; or dissolve 2 x PMS in 100ml sterile water.

Inject with an accurate syringe intramuscularly.

i.e. = international units (concentration)

300i.e. = 2.5ml of solution (Young Dormer ewe)
360i.e. = 3ml of solution (Mature Dormer ewe)
420i.e. = 3,5ml of solution
480i.e. = 4,0ml of solution

10. Scanning ewes

Since intensive sheep farming can be seen as a form of precision farming it is extremely important to scan ewes that have be mated in order to determine well in advance which ewes are pregnant and which ewes are not pregnant.

If a sponge/CIDR fell out, the ewe must have another chance in the following group that will be sponged. It has nothing to do with her fertility and should therefore not be penalised.

When it comes to scanning it is indeed a different story.

Ewes can be scanned after 6 weeks since they were mated. It is not only important to determine if the ewe is pregnant, but also to determine how many lambs the ewe is carrying. It will indeed affect management and the amount of concentrate supplement given to the ewe depending on the amount of lambs she is carrying as determined by the scanning.

The Mamre system works slightly differently because ewes are in a strict production system. We believe that a ewe's current pregnancy status must be seen in the context of her three lambing's over two years. If the ewe over her two previous lambing's has already given twins/multiples, then she is still very important to us because she is compliant to our minimum standards and she will therefore get the same feeding as the ewes with multiples. This is done because at this stage of her production cycle the ova formation already plays a role on her future coverings and potential conception rates.

If a ewe is not pregnant, in our system she is given a second chance, because the rams are only with the ewes for 24 hours. We will not give her a second chance with follow

up rams but will give her a second chance to be resynchronized. A note is made against this ewe in her records and if she skips ever again she will be culled.

This is our method of identifying sub fertile ewes. They are fertile, but they cannot handle the accelerated lambing system.

After the group of ewe's pregnancy has been determined, they go back to the main flock of ewes for the rest of their pregnancy with a good ration and sufficient roughage.

11. Preparation of ewes for lambing

Management:

Six weeks before the ewes lamb, they are taken out of the main flock to start preparing them for lambing.

The main reason for this is to ensure that the ewe gets optimal nutrition for her udder development, to ensure to the lambs grow and are strong at lambing, and ensure lamb survival. All the last necessary activities must be completed, such as dosing, vaccinations, shearing, hoof care, etc. If your circumstances permit and it is your preference ewes can be sheared at this stage.

Thereafter the ewes are put in a small restful camp to ensure they are optimally prepared for lambing.

Health:

The ewes have now be dosed and all their vaccinations must now take place to ensure that are protected at birth. The ewes will now also go through an adaptation period for a complete ration, therefore they must be vaccinated against Pulpy Kidney and any other prevailing diseases.
It should be done now as the ewes will be put in a small restful camp and shouldn't have any activities performed on them from then on. Here it is also important to dose the ewes for Nasal Worm, because Nasal Worm can hinder the ewe's sense of smell, inhibiting the bonding between the ewe and her lambs.

Nutrition:

The ewes are now placed in a small camp with adequate roughage, where they will be adapted to the complete ration that will be provided in the lambing pens. This complete ration must be able to provide for all the ewes nutritional requirements over the 10 days that she is the lambing pen.

Adaptation:

- 6 weeks before lambing: 250g/ewe/day
- 5 weeks before lambing: 500g/ewe/day
- 4 weeks before lambing: 750g/ewe/day (the ration must now be provided for as morning and evening portions)
- 3 weeks before lambing: 1kg/ewe/day
- 2 weeks before lambing and after lambing: 1.25kg and 1.5kg/ewe/day

When the ewe is put in the lambing pen three days before lambing, she is adapted to the ration and she can now have the feed provided to her as ad lib. Without any negative results.

12. Preparation of the lambing pens

The lambing were up to now would have been empty for 2 to 3 weeks and all the bedding will be nice and dry. A week before the ewes are put in the lambing pens, the pens should be prepared and well cleaned.

The pens are sprayed with F10 solution / HTH solution. All feed buckets and water buckets are also washed with F10 solution. The pens are also washed. On the floor feed lime is thrown down, which changes the pH in the bedding resulting in helping kill bacteria and limiting the spread of disease. Then pine shavings are thrown down on the floor of each pen. Pine wood has turpentine in it which prevents flies from laying eggs in the bedding.

We use a “deep litter” bedding method. So we don’t take the shavings out every time after a ewe has been in a lambing pen, we just throw a fresh layer on top of the older bedding as described in the previous paragraph. The reason for this is that the bedding acts as insulation layer in the pens and this helps with temperature control, thus providing a warm environment for the new born lambs. The deep litter bedding also absorbs water well and thus the pens stay nice and dry. The shavings are first removed when the bedding layer becomes too high and the lambs can start getting through the top railings of the pen. When the shavings are cleaned out always leave 10cm behind as a foundation layer to build up on.

Furthermore the water bowls should be checked to ensure they work well and there is no leaks that will make the pens wet. The infrared lights must also be checked to ensure they are in working order in case you experience a sudden cold front. Railings must be checked to ensure they are placed firmly to prevent injuries.

Finally the barn is then sprayed for insects, flies, roaches, fleas, etc. FENDONA or anything similar can be used, it should be something that is friendly to use in a house with a baby as lambs chew everything and can easily be harmed by a harmful product.

12.1 Size of the lambing pens

With an intensive sheep farming system with the use of lambing pens, there are two ways that it can be done in practice:

- Ewes lamb in small camps and after lambing are put in the lambing pens until they are ready to come out. For this purpose can a smaller lambing pen be used, namely: 1.5m x 1.5m. With this practice the ewe lambs outside of the pen, therefore there is no risk of the ewe lying on top of her lambs in the pen.

- The ewes are placed in the lambing pens before they lamb and therefore lamb in the pen. This brings certain problems if the pen is too small. We are talking about pens being cramped. It is therefore important to have a larger pen, so when a ewe has a multiple birth she has enough space and won't lie on her lambs which can result in unnecessary losses of new born lambs. For this practice a lambing pen with the dimensions of 2m x 2m is used.

This is the heart of the business, but we must always guard not to spend too much money on this part of the operation. We recommend that everyone first have look at what facilities you have on the farm and which ones can be used for this purpose. All farms have old milking parlours or stables, pigsties, or any structure that is not in use. We know of farmers that converted old farmhouses into very beautiful lambing pens. Use what you have and use your funds to purchase good genetics instead. The ewe will take care of you and not the facilities.

13. Lambing

As previously mentioned, the ewes are placed in the lambing pens three days before her lambing date. The reason why we do this is to let the ewes readjust to the barn, the lights in the evening, people walking through and the sounds. By the time they start lambing the ewes are so used to us we can sit and observe to ensure nothing goes wrong. If something does go wrong we are close by to help.

It must always be peaceful and quiet in the lambing pens, with no shouting or rushing around in the barn allowed.

13.1 The biology of birth

The lambing process is controlled by complex hormonal changes that stimulate the foetus's reaction to stress factors. At the end of pregnancy the space that the foetus or foetuses occupy may be limited because of the size of the foetus or foetuses, the placenta and a large amount of fluid. The foetus receives oxygen and nutrients from the ewe's blood circulation via the placenta and umbilical cord. In the final stage of pregnancy is the process critical as it is very demanding on the ewe to meet all the demands of the growing foetus. These factors give rise to lamb stress which results in the release of a steroid hormone known as cortisol. Cortisol then goes into the ewe's blood circulation and is responsible for the start of lambing.

The cortisol, which is secreted by the foetus causing progesterone that is secreted by the cotyledons and is responsible for maintaining pregnancy to be converted to another hormone, namely oestrogen. As progesterone levels drop and oestrogen levels

rise another hormone is stimulated, Prostaglandin F2 alpha which makes the uterus contract thus causing the lamb to move into the birth canal.

These hormone changes can be observed in a ewe in many different ways. For example as the time to lambing gets closer ewes tend to be more interested in new born lambs and they try to still the other ewe's lambs. We call these ewes "Scheming Ewes". Therefore it is important that the lambing pens are properly closed off between each other so that lambs can't be attracted to these scheming ewes. The ewe's udder gradually starts to fill out so that just before birth it is swollen with colostrum. With the gradual contraction of the uterus the ewe will start to stand away from the rest of the ewes, becoming restless and she will look like she has a nose itch as she will scratch her legs in a specific area. The ewes tend to stand up and down regularly, making licking and biting movements.

13.2 The birth

While all the hormones are working in the female and birthing begins, another hormone known as oxytocin is separated from the corpus luteum. This causes the stiff rings of the cervix to relax and dilate to allow the lamb passage. The ligaments that are attached to the pelvis bone also relax and more elastic during lambing.

Contractions of the uterus puts pressure on the cervix that systematically will begin to relax so that the lamb can proceed through the birth canal.

Until now, the female played a passive role and its own body did all the work. When the lambs head is in the pelvic area this will stimulate the female to accelerate the process and she will also start contracting the muscles of the abdomen or simply put she will start to thrust. The contraction intervals will become shorter as birth progresses.

The water bag will sometimes emerge from the swollen vulva, but this is not always the case since the bag could have broken. The legs and nose of the lamb should then pass into the vulva. By now only a few powerful contractions are required to push the lamb out.

The tearing of the umbilical cord, the strange environment outside the safety of the womb, the sudden change in temperature and coupled with the comfort provided from the ewe, these are all factors that will stimulate the lamb to take its first breath.

Always remember during birth the golden motto is:

“Maximum control with minimum interference”

A ewe must be helped to lamb only if you are certain that the ewe will not lamb successfully on her own, or her and/ or the lamb’s life is in danger would you intervene.

Conditions that might require possible assistance:

- The female is in clear discomfort and the abdominal contractions have been ongoing for an hour or longer, but there are no signs of the lamb in the vulva.
- The lamb is in the vulva, but nothing further is taking place during repeated abdominal contractions.
- The lamb is partially visible in the vulva, but the female has stopped thrusting and walks around or just lies on her side.
- The lamb is in an abnormal position – tail first, or head outside but no front legs, or only one foreleg.

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(The farmer with small stock: The Sheepherder)

Normal course of lambing, the ewe continues to scratch, the water bag is clearly visible and the hooves and nose of the lamb are visible inside the water bag. Note the bright colour of the water, if green or yellow it indicates stress in the lamb and therefore you must pull the lamb immediately. If you do give assistance to the ewe during birth, it is necessary to inject the ewe intramuscularly with Terramycin at 1ml per 10kg to prevent infections in the ewe.

This ewe has lambed and is busy licking her twins. The afterbirth is still in and the lambs are already searching for the teats to get the colostrum rich milk.

13.3 Dealing with udders after lambing

It is very important not to interfere while the ewe cleans her lambs. This is a very important time for the bonding process between the ewe and lamb. When the ewe is finished lambing, the lambs have drunk and the afterbirth has been expelled, it is advisable to check the ewe's udder to see if the teats are both open and milk flows easily. The teats are sometimes short and the lambs can't suckle adequately and the lambs gets hungry as no milk flows out freely.

13.4 Handling of the lambs

It is important to remember that any contact with the lamb can disrupt the bonding process because your hands emit an odour that the ewe is not familiar with. Therefore it is important to wash your hands with a neutral smell soap before you work with newly born lambs. If it is cold put the infrared lights on during lambing so that the pen is already warm once the lamb is born. If the lamb is very cold a hot water bottle can be used to quickly get the lamb up to temperature as soon as possible. If the lamb can't drink, milk the ewe and give the colostrum rich milk to the lamb via bottle and teat, in order to build up the lamb's glucose levels as soon as possible.

Normally a strong born lamb will drink well within six hours after birth, if not the ewe must be held and the lamb must be assisted to drink from its mothers udder. If the

lamb continues to struggle on its own continue this practice until it can drink sufficiently on its own. Within the first eight hours the lambs are weighed and their weights are recorded.

The umbilical cord can be disinfected with iodine to prevent infection.

The best picture is of a ewe with her strong healthy lambs in the lambing pens!

13.5 Feeding in the lambing pens

The ewes are now accustomed to the total mixed ration that they started receiving six weeks before lambing. She will now continue with this ration for the whole time spent in the lambing pen. It is therefore very important to provide the feed as ad lib and to make certain that their feed buckets are always full. They must never be hungry. The ewes stop eating possibly for a day or so before they lamb and once they have lambed they will eat more than usual and therefore must be provided for adequately. From day five the lambs will also start eating. The ewes and lambs remain in the lambing pens for 10 days after lambing.

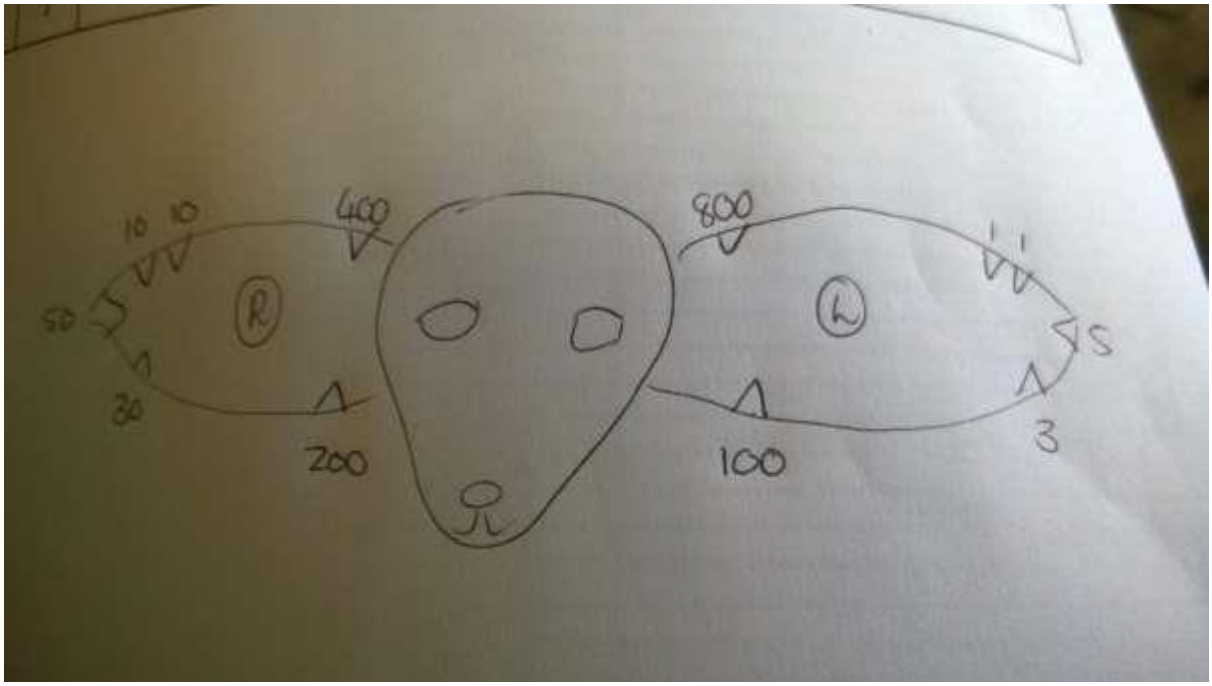
Make sure that the ewes always have clean water. If you use buckets it is preferable that they are a light colour like white, because then you can see if the ewe has dirtied her water more readily. During this period everything should be optimally right.

If a ewe develops diarrhoea during this period, it is advisable to give her some Lucerne alongside the total mixed ration to bind the stomach. It usually works very well and no medication is needed to help.

14. Removal of ewes from the lambing pens

14.1 The identification of ewes and lambs

On day seven, the ewes and lambs are marked. The lambs are caught, ear notched and a rubber band is placed on their tails. We use the ear notch method as tags get lost and look ugly. Ear notches are permanent and can't be lost.



The elastic band is put on the 3rd limb of the tail, under the two ligaments that are visible on the underside of the tail. The tails are not docked to short, because the tail must protect the sensitive areas from the sun, preventing cancer and a moving tail helps prevent blow fly strikes. A longer tail ensures that the sphincters of the anus are intact and so rectal prolapses are prevented.

As mentioned we use the rubber bands to dock the tails, there are other methods but we like the closed method (rubber band) since our lambs are in the lambing pens and the possibility of infections are present all the time an open wound method of docking is very disadvantageous. When the tail falls off, the area where the rubber band was

placed has dried and by that time the lambs are outside in contact with the sun which further assists with the decontamination of the tail wound.

Furthermore, the ewe and lambs are marked with spray paint on their sides, so that you can immediately identify which lambs belongs to which ewe when they come out the lambing pens. This makes identification much easier, especially if there is a problem, ewes and lambs can quickly be paired and put back into the lambing pens until the problem is resolved.

Above you can clearly see the green number on the side of the lamb and this number matches the ewe. This number is given to the ewes and lambs according to which lambing pen they were in. The ewe also gets a red number on her back according to which group she lambed in (Group 1 – Group 8).

14.2 The process of moving out the lambing pens

As mentioned this is a process and all ewes are can't be let out of the lambing pens at the same time. It is very chaotic if done so as the ewes and lambs get very confused.

The process we follow:

- The ewes with singles go out first in the small camp in front of the barn. We give them two hours to get comfortable, and if we see that each ewe finds her lamb easily, we let start letting more ewes and lambs out the pens.

- The ewes with twins are now let out, but only three ewes at a time. We also give them two hours and if we are satisfied that the ewes are finding their lambs we let out another three ewes.
- The triplets and quadruplets are the last to be let out and they are put into a separate camp. Once they are settled, they mustn't be confused again.
- The process must not be rushed as the ewes will lose their lambs.
- The process can be done over two days, especially with young ewes who have lambed for the first time.
- The lambs come into contact with solid ground, the sun, other lambs and ewes for the first time in their lives and now they have to look for their own mothers. This is a major crisis in their lives and they shouldn't be rushed, and be there to help where necessary.

14.3 Creep feeding

The lambs are already accustomed to eating, because they had the example shown by their mother in the lambing pen when she ate.

To accustom lambs to the creeping feeding pen it is important to first allow enough space for both the ewes and the lambs to pass through the creep hurdle and to put the ewes feed into the feeder. The lambs go with the ewes to the feeder and therefore they get familiar and comfortable with the creep feeding pen. When you see the lambs eating regularly at the feeder, you can adjust the creep hurdle to only let the lambs through.

We found that feeding the same feed as the ewes as a creep feed works very well, because the lambs are already accustomed to the feed and when we fed a specific creep feed the lambs did not eat it and we just wasted feed.

15. Lamb dosing programme

- **4 weeks**

This is the first dosing the lambs get. By now the lambs are eating well and they are strong.

The first dosing is for Tapeworms and we also give them vitamins and minerals.

With this dose we also check each individual lamb's tail wound to see if we need to spray any antibiotic spray. We evaluate the lamb's growth and ensure the lamb is growing and developing well.

We also check the umbilical cord area and make sure everything is clean and dry.

These lambs are 4 weeks old and they are beginning to play and run around.

- **8 weeks**

At 8 weeks, the lambs are weaned and this is a major milestone in their lives.

  - Dose for Roundworms and Tapeworms.
  - Vaccinate 1st chlostridiale disease and Pasteurella and 1st choryne bacteria.
  - Give minerals and vitamins.
  - Tattoo lambs (Right ear: herd designation mark and birth year) and (Left ear: the notched number of the lamb).
  - Each lamb is weighed.

These lamb now go to the feedlot where they get the feedlot ration and high quality roughage.

8 week old weaned lambs in the feedlot.

- **12 weeks**

At 12 weeks, the lambs are dosed and vaccinated:

- Dose for Roundworms and Tapeworms.
- Vaccinate 2nd chlostridiale disease and Pasteurella and 2nd choryne bacteria (Boosters).
- Give minerals and vitamins.

16. Weaning process at 8 weeks old

16.1 Drying up of ewes

It is important to remove all rations from ewes at week 7 and they just get ordinary grass/low quality roughage. Because the ewes are on such a good ration and they have

so much milk, it is very important to stop feeding them the high quality ration in order to help slow down their milk production so that at weaning no udder problems develop.

16.2 Feeding of the lambs

When the feeding of ewes is stopped, the lambs get their feed in the creep pen that they are already accustomed to. If you prefer you can now gradually proceed to the feedlot ration, so that when they are weaned they are already adapted to the new feedlot ration.

16.3 Ewe dosing programme at weaning

When lambs are weaned at eight weeks of age, it is the beginning of the next cycle (project plan). This date is the ewes first date for this project plan and are the ewes back to the preparation part of the project plan (see point 8.2). With the weaning of the lambs the ewe now gets dosed and vaccinated as already described. They have four weeks to get over the weaning shock and they must be repaired for the next sponging process. The ewes now go to the main flock.

Now it can be seen that there is a real pressure that we place on the ewe for this system to function. But be rest assured that any functional, fertile ewe can be handle this system successfully for the duration of her life.

Many people ask the longevity of a ewe in this system, and our answer is: If her teeth, her hooves and her udder can handle it and are still in condition then she can keep producing until she is very old. These ewes get very good feed throughout the cycle and therefore she can handle the system and handle it for a long time.

17. Management of lambs in the feedlot

17.1 Nutrition

The lambs have been prepared from week seven to the feedlot ration and they continue with this feedlot ration ad lib. They also receive high quality roughage in the feedlot, which is always available. There must be sufficient eating space so that all the lambs have the opportunity to eat at the feeding trough.

Another very important aspect is sufficient clean water. Water troughs must be cleaned regularly. Troughs should also be checked for leaks daily to ensure there is no water collecting around the trough thus creating mud which can lead to health problems.

17.2 Shade

Lambs should have preferably have access to a shelter or barn, where they can seek shelter in very hot or cold conditions. With extreme variations in weather the lambs use that energy to keep comfortable instead of for growth. If it is very hot the lambs won't have a good intake of feed and therefore they don't grow as they should, which extends their time in the feedlot and this results to higher feed costs. Every day longer in the feedlot due to poor planning of facilities leads to unnecessary feeding costs.

17.3 Rain

The same applies as with shade. With rain the lambs also don't have good intakes, they get cold and use energy to keep warm. This reduces growth and also leads to an extended time in the feedlot resulting in higher feeding costs. Rain makes the feedlot very difficult to manage because it becomes muddy and this can lead to various problems.

What we do when there is long periods of rain and we see that the feedlot is getting muddy, is that we move them to one of the small camps with better drainage. We found that even though they are outside they do better than in the muddy feedlot. So the planning of your feedlot is also important when it comes to drainage.

17.4 Cold

Cold is also a factor that should be considered. Many people shear their lambs as soon as their wool is right. The season must also be taken into account. Lambs that are using energy to keep warm won't grow to their potential. With us we get cold winter winds that blow from the snowy Drakensberg, our ambient temperatures decrease significantly and therefore in our circumstances is a barn very important. We must make certain that the lambs live in the most optimal conditions so that they can achieve the right weight as quickly as possible.

17.5 Space

With the intensive sheep system, the use of a feedlot is very convenient and a small space can be used for this goal. Because lambs are weaned in groups it is not necessary to have a large facility. There must be enough feed trough space for all the lambs to eat at once with minimal interference of one another.

A feedlot with a ground floor and shelter like we have at Mamre you need to provide 1,1m² per sheep with a mass of 20 - 40kg.

A feedlot size of 10m x 10m is sufficient for 50 – 80 sheep depending on their weight.

A feeding space of 8cm per sheep is needed where sheep a have free access to feed.

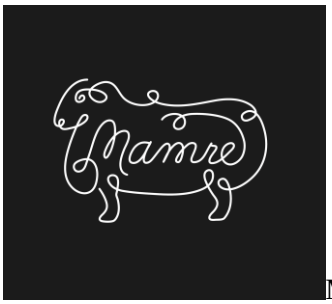
(Dr. T.M. Laas: Practical tips for the planning and construction of facilities at a Sheep feedlot.)

17.6 Young ewes and young rams

At around 12 weeks of age we separate the young ewes and the young rams. This is done because the rams start chasing the ewes. The ewes then don't have enough time to eat and gain enough weight. Lambs of the same sex are much better in feedlot as they are much calmer.

18. Management of young ewes

Activity	Day	Date	Nutrition	Dosing & Vaccinations
Wean lambs at 8 weeks and weigh at 42 days	0		Feedlot ration ad lib with roughage	Deworm, vaccinate against Pulpy Kidney, Pasteurella and Corynebacterium, give minerals and vitamins A & E. Vaccinate Blue tongue ABC and Enzootic Abortion
Dose lambs 12 weeks (3 months)	28		Feedlot ration ad lib with roughage	Deworm, vaccinate against Pulpy Kidney, Pasteurella and Corynebacterium, give minerals and vitamins A & E. Vaccinate Blue tongue ABC and Enzootic Abortion
Weigh lambs 15 weeks (3 months & 3 weeks)(105 days)	21		Main flock ration	
Weigh lambs 35 weeks (8 months)	135		Main flock ration	
Weigh lambs 43 weeks (10 months)	61		Main flock ration. Start preparing ewes for sponging, feed ration 500g/per ewe/day	



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Activity	Day	Date	Nutrition	Dosing & Vaccinations
Wean lambs at 8 weeks and weigh at 42 days	0		Feedlot ration ad lib with roughage	Deworm, vaccinate against Pulpy Kidney, Pasteurella and Cornyebacterium, give minerals and vitamins A & E.
Dose lambs 12 weeks (3 months)	28		Feedlot ration ad lib with roughage	Deworm, vaccinate against Pulpy Kidney, Pasteurella and Cornyebacterium, give minerals and vitamins A & E. Vaccinate Rev 1
Weigh lambs 15 weeks (3 months & 3 weeks)(105 days)	21		Main flock ration	
Weigh lambs 19 weeks	30		Main flock ration	
Weigh lambs 23 weeks	30		Main flock ration	
Weigh lambs 27 weeks	30		Main flock ration	
Weigh lambs 31 weeks	30		Main flock ration	
Weigh lambs 35 weeks	30		Main flock ration	Deworm, vaccinate against Pulpy Kidney, Pasteurella and Cornyebacterium, give minerals and vitamins A & E.
Weigh lambs 39 weeks	30		Main flock ration	

19. Management of young rams

20. Profitability of the system

20.1 Five lambs in 2 years

In the Mamre intensive system is profitability critical. The aspect that drives profitability is the production of the ewes. For this system to be profitable every ewe on the farm must:

- Be on an accelerated lambing cycle – lambing every eight months.
- Have five lambs in two years.
- Lambs must be slaughtered at 16 weeks of age with a dressed carcass weight of 25kg to 30kg.
- Value addition through to the final product, etc. Hormone free lamb directly to the house wife.

20.2 Weaning percentage of 170% per lambing cycle – 255% weaning percentage per annum

The intensive lambing system is production driven. The more lambs the ewes produce the larger the profit is at the end of the day.

20.3 Requirements for profitability

- Weaning percentage as mentioned above.
- Value: The full value chain must be used, and therefore marketing takes place directly to the end consumer.

21. Sheep breeds and intensive sheep farming

There are many sheep breeds in South Africa today. Sheep across South Africa are adapted to function under certain circumstances.

It is important to realize that not all sheep are cable of adapting to an intensive system. There are various breeds that are adapted to extensive conditions. These breeds are too wild in the lambing pens and they hurt there lambs, they also get depressed and stop eating.

We decided on the Dormer after we had done our research, because they are specifically bred for slaughter lamb production systems and they are also adapted to the small camp environment. They don’t care to stand for 10 days in a lambing pen as long as she gets her feed and her lam is with her, they are very satisfied. She also has a calm temperament, and doesn’t injure her lambs in the pens.

It is also a sheep that grow fast and delivers quality carcasses.

Furthermore, the Dormer is a white wool sheep that is used with great success in cross breeding programmes.

In our view the Dormer is the breed to consider for intensive sheep farming. There is other breeds that can be used successfully, but not as profitably for a slaughter lamb production system compared to a Dormer.

22. Diseases and treatment

There are many diseases and even more treatments for the various diseases. There are also very good sheep handling and disease books available on the market, namely:

- Small Stock Disease (Kleinveesiektas) – Jan de Wet and Gareth Bath.
- Farm with Small Stock (Boer met Kleinvee) – The Shepherd (Die Skaapherder).

Then it is very important to consult your local veterinarian about specific diseases found in your area and also a specific dosing and vaccination programme.

23. The last word

Manie was born in Frankfort and grew up on Mamre and I (Karin) was born in Rustenburg. We met at RAU where I studied B. Cur. We got married on the 16th of December 1989. We both studied further and then started with our respective careers. Manie is an industrial psychologist and I am a registered nurse. We were always involved with the farm, but never physically farmed.

In 1992 Manie's father passed away and then our "Farm Story" began. Mamre was always a sheep farm and Manie grew up in a sheep kraal. When we started farming we started part-time, therefore we started with cattle. Sheep require your eyes and feet regularly.

From 2005 we began farming fulltime and decided to start farming with sheep again. We first started with a breed for extensive sheep farming but soon released they were not adapted to this part of the world as well as not suitable for the intensive system. We were forced into another direction. Manie always had a desire to farm with sheep for the purpose of meat and therefore we started investigating the Dormer. We found that they were well suited to the intensive system with lambing pens. We began with 25 stud ewes and have grown to where we are today. The Mamre Dormer stud started in March 2010 and the motto every day is:

"Our Passion, Our Life"

Manie & Karin Wessels 0828541491

“Hierdie Buksies is Bielies!”